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Price-Level Targeting: A Post Mortem?

Price-level targeting has convincing advantages, especially as a tool for avoiding the worst consequences of economic downturns. Then why haven't central banks experimented with the regime?

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The Study In Brief

Recent research has shown that monetary policy based on price-level targeting has several advantages over the traditional inflation targeting method, particularly in times of economic distress. Although several central banks have been coping with the aftershocks of the 2008 financial crisis for prolonged periods, none has adopted price-level targeting.

This *Commentary* reviews some of the reasons for this in the Canadian and American contexts. The relative mildness of Canada's 2008-2009 recession convinced the Bank of Canada that inflation-targeting can work in troubled as well as tranquil times. Meanwhile, the severity of the US recession led the Federal Reserve to explore several types of unconventional monetary policies, but not price-level targeting. The latter requires a commitment to offset the effects of unexpected inflation on the price level and makes monetary policy history-dependent.

The Fed prefers to exercise discretion, and inflation targeting allows central banks to ignore past inflation shocks and engage in fine-tuning of the business cycle. The Bank of Canada shares the Fed's predilection for discretion in this regard.

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Twenty-nine central banks currently have explicit targets for their economies' inflation rates and have adopted monetary policies guided by some form of flexible inflation targeting (henceforth IT).[1]

Only Finland and Spain, upon joining the eurozone, have abandoned IT, thereby relinquishing control of their monetary policy to the European Central Bank. Meanwhile, price-level targeting (henceforth PT) is an alternative monetary policy framework that offers potential advantages over IT.[2] PT can, for example, lead to greater stability both of inflation and of output. In troubled economic times such as the recession in the aftermath of the 2008 financial crisis, PT can therefore increase the effectiveness of monetary policy, especially when the central bank's policy rate is stuck at its lower bound of zero.

In spite of these advantages, and although several central bank policy rates have been at or near their lower bound for prolonged periods since the financial crisis, no central bank has seriously considered adopting PT except for the Bank of Canada, and interest in PT in academic circles seems to have waned. The Bank of Canada, when it renewed its inflation target agreement with the Government of Canada in 2006,[3] announced its intention to study the costs and benefits of switching to PT. Nevertheless, it decided not to make the change when the agreement was again renewed in 2011.

This *Commentary* reviews some of the reasons why PT has not been tried and why interest in it has decreased. In Canada, the mildness of the recession contributed to policy inertia: Canada's IT framework is still delivering acceptable results. As well, the Bank of Canada expressed doubts concerning how well the public would understand the workings of a new monetary policy framework, which is a necessary condition for its success.

PT is a regime that entails, above all, a commitment to undo the effects of shocks on the price level. It makes current monetary policy conditional on past shocks and requires that a central bank commit to the future course of its monetary policy. Both the US Federal Reserve and the Bank of Canada have explicitly stated their preference for being able to exercise discretion, and this is a decisive factor explaining why they have not adopted PT. Indeed, the Fed's experiments with unconventional monetary policy since 2008 have had the effect of increasing its use of discretion.

THE OPERATIONAL DISTINCTION BETWEEN IT AND PT

Before discussing PT's advantages, it is useful to review the main operational difference between IT and PT. The former, which has come to be thought of as conventional monetary policy, involves setting

I would like to thank Philippe Bergevin, Angelo Melino, Chris Ragan, Daniel Schwanen and anonymous reviewers for comments on previous versions. All remaining errors and omissions are my own. Email: ambler.steven@uqam.ca.

1 See Lim (2008) for a list of 28 countries that were inflation targeters at the time. In January 2012, the Federal Reserve announced that it would explicitly target a rate of inflation of 2 percent, rather than periodically stating a desired target range.

2 See Ambler (2009) for a detailed summary of some of the research that supports this conclusion.

3 See Bank of Canada (2006).

an inflation rate target and using the short-term nominal interest rate as the primary tool for achieving the target.[4]

Under IT, unexpected deviations from the inflation target are forgotten. The central bank merely tries to bring inflation back to its targeted rate. For this reason, unexpected changes in inflation have a permanent effect on the price level. In addition, IT is "flexible" in permitting other objectives. Carney (2012, p. 6) defines the framework as follows:

> Thus, under flexible IT, the central bank seeks to return inflation to its medium-term target while mitigating volatility in other dimensions of the economy that matter for economic welfare, such as employment and financial stability. For most shocks, these goals are complementary. However, for shocks that pose a trade-off between these different objectives, or that tilt the balance of risks in one direction, the central bank can vary the horizon over which inflation is returned to target.

In contrast, PT involves setting a pre-announced path for the price level and using the same policy instrument (the short-term nominal interest rate) to affect prices by influencing aggregate demand. This key distinction between IT and PT means that the latter approach involves offsetting the impact of inflation shocks on the price level. Under PT, inflation shocks can have only a temporary effect on the price level.

This crucial difference is illustrated in Figure 1 below. Under IT, inflation is gradually brought back to its target rate after a positive inflation shock, leaving the price level to follow a permanently higher path. Under PT, inflation is temporarily brought below the target rate, and the price level gradually returns to its initial target.

This operational distinction is related to the academic literature on optimal monetary policy – regarding discretion versus commitment. In the classic reference, Kydland and Prescott (1977) argue that a policymaker can achieve superior outcomes by committing to a future course of action.[5] By correcting for the impact of shocks on the price level, PT introduces "history dependence" into the monetary policy framework: past shocks affect current policy, as if the central bank committed to its future policy on the basis of those shocks.

Under IT, the central bank needs only to take current economic conditions into account: bygones are bygones. Average inflation only will equal the target by chance (if positive and negative inflation shocks offset each other). Under PT, average inflation will be equal to its target rate in the long run by design.

For his part, Woodford (2001, 2012) notes that historical dependence is a hallmark of most optimal policy rules when agents are forward-looking. It is the commitment to offset the impact of shocks on the price level that gives PT its advantages as a stabilization tool, as also argued in the next section. Meanwhile, Vestin (2006) shows that PT can substitute for a central bank's explicit commitment to its future actions.[6]

The Advantages of PT

PT can, under the conditions outlined below, lead

4 It is important to note that both PT and IT are compatible with positive trend inflation. The pre-announced path for the price level can have a positive slope.

5 See Dotsey (2008) for a nontechnical introduction.

6 The central bank in Vestin's model can do just as well by aiming at a price-level target without committing to its future actions as it can by aiming to control inflation while committing to future policies.

to less volatile fluctuations in both inflation and the price level compared to IT.[7]

Consider an unexpected increase in inflation, resulting from an increase in spending or an increase in the cost of firms' inputs.[8] Under IT, the central bank would raise its interest rate in order to reduce demand, which dampens price increases and gradually brings inflation back down to its target. Under PT, the central bank would commit to reducing inflation below the target rate in the medium term in order to bring the price level back to its target. As a result, future inflation under PT is expected to be lower than under IT. Knowing this, firms that fix their prices for several periods would not raise them as much since they know that the general price level will not be as high in the medium run.[9] Because expected future inflation is lower under PT, current inflation is lower as a result.

This PT "expectational bonus" means that the central bank need not work as hard to fight inflation. It requires only smaller interest rate hikes to bring the economy back to its long-run equilibrium, with the result that demand decreases less. If the economy is continually hit by shocks that affect inflation, both inflation volatility and output volatility will be lower under PT than under IT.

Rational expectations and credibility are key factors in making PT a superior tool for economic stabilization. Since lower expected future inflation moderates firms' current price increases, it therefore reduces current inflation. The theory of rational expectations holds that individuals' forecasts of future inflation are correct on average and their forecast errors are unrelated to available information. However, for this to be the case they must understand how the economy works and how the central bank's commitment to return prices to their target path means lower future inflation than under IT. Finally, individuals must believe in the central bank's commitment to returning the price level to its target path. These assumptions seem strong, but evidence discussed below seems to support them.[10]

Advantages at the Zero Lower Bound

When its policy rate hits a lower bound of zero, a central bank can no longer use the rate to directly increase aggregate demand. In such a situation, PT allows monetary policy to be much more expansionary than it could be under IT. As noted by Boivin (2009), "By forcing higher inflation than under IT and, thus, a lower real interest rate, PT enables the central bank to respond more aggressively to a deflationary environment." Consider an economy in which the policy rate is expected to remain steady for some time, with inflation well below its target rate. Since the nominal interest rate cannot go any lower, the central bank's ability to stimulate spending depends on its ability to affect the real interest rate by affecting inflation expectations.

Under IT, inflation will be expected to remain low for as long as the economy remains in its depressed state, with the interest rate at its lower

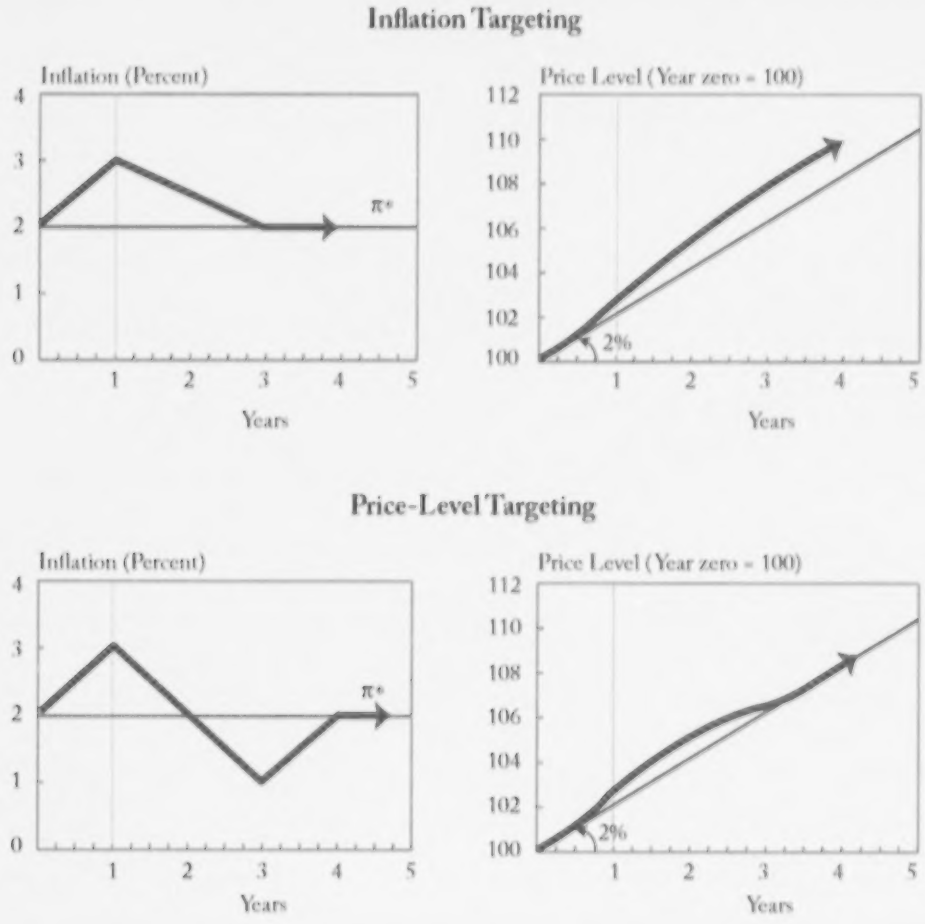
7 PT has other potential advantages that we ignore here, including increasing the predictability of future asset values when assets are denominated in nominal terms. See Ambler (2009) for a more detailed summary of some of these other advantages. Boivin (2009) provides a detailed analysis of the beneficial effects of PT on price-level predictability. See Parkin (2009) for a similar explanation of PT Tnefitsion as a stabilization tool.

8 The argument is completely symmetric in the case of a negative shock.

9 This effect is built into the "New Keynesian Phillips curve," which is a central part of the macroeconomic models used as forecasting tools by many central banks and in much current research. This curve states that current inflation depends on expected future inflation and on the current output gap.

10 The only historical experience with PT was in Sweden in the 1930s. For this reason, the evidence comes from model simulations and from laboratory experiments.

Figure 1: Inflation vs. Price-level Targeting



Source: Kahn (2009).

bound. Firms and households expect that sooner or later inflation will increase towards its targeted level.[11] Under PT, they know that inflation will have to rise above its trend rate in order for the price level to get back to its target path. However long the horizon for the price level returning to its target path, average expected inflation over that horizon will be equal to the target or trend level of inflation.

11 This reasoning neglects the possibility of multiple long-run equilibria under IT, as discussed by Benhabib, Schmitt Grohé and Uribe (2001). They show that a negative economic shock may propel the economy towards this low-inflation steady state, where it can remain stuck for a very long time. Ambler and Lam (2013) demonstrate that a PT regime does not suffer from this problem.

Comparing the two situations, expected inflation will be higher under PT than under IT over most horizons. This phenomenon is also present when the policy rate is not at the lower bound. The divergence in real interest rates between PT and IT increases dramatically the longer the interest rate is expected to remain at the lower bound. In turn, real ex ante interest rates at different horizons will be lower under PT.

Meanwhile, interest-sensitive components of spending will be higher under a PT regime. By undertaking to return the price level to its target path, the central bank is promising to make monetary policy less restrictive to compensate for having been too restrictive (since it cannot reduce its policy rate below zero) while at the lower bound. This is a clear example of the history-dependent nature of monetary policy under PT, following Woodford's (2012) analysis.[12]

Once again, credibility and commitment are important to achieving an effective policy. Because inflation is likely to exceed the target rate for a period under PT, the central bank could very well be tempted to renege on its commitment to inflate. If inflation is costly, the bank could increase economic welfare by breaking its commitment to higher inflation. The longer the economy remains stuck at the lower bound the higher inflation must be to get back to the target path, and the greater the temptation to renege. This is a classic example of the so-called time-inconsistency problem. Kydland and Prescott (1977) showed that optimal policy under a PT commitment is inherently subject to time inconsistency. Reneging on promised future policies can be beneficial, but if everyone understands this, the announced policies will not be believed without a credible way to commit to them.

Expanding the Toolkit: Unconventional Monetary Policy

Because of PT's theoretical advantages, especially at the lower bound, PT has garnered widespread support among academic economists and policymakers.[13] In a *New York Times* op-ed piece, Romer (2011) succinctly summarized the three main alternative policy instruments available to a central bank such as the Fed, including PT:[14]

> The Fed could engage in much more aggressive quantitative easing, both in size and in scope, to further lower long-term interest rates and value of the dollar. It could more effectively convey to markets its intentions for the funds rate, which would also lower long-term rates. And it could set a price-level target, which, unlike an inflation target, calls for Fed policy to take past years' price changes into account. That would lead the Fed to counteract some of the extremely low inflation during the recession with a more expansionary policy and lower real rates for a while.

Forward guidance and quantitative easing (henceforth QE) were both tried by the Fed and the Bank of Canada post-2008;[15] PT was not. The main distinction between the first two and PT is that both the former can be implemented in ways that do not hinder the central bank's ability to exercise

12 Amano and Ambler (2009) establish that PT is more effective than IT both in keeping the central bank's policy rate from hitting the zero lower bound and in reducing the length of episodes in which the policy rate is at zero.

13 See for example Krugman (1998) in the context of Japan, as well as Bernanke (2003), Mankiw (2008), Hall and Woodford (2009), Evans (2010) and Romer (2011).

14 See Williams (2011, 2012) for a more detailed discussion of quantitative easing and forward guidance.

15 The Bank of Canada merely announced its willingness to engage in massive purchases of securities if the circumstances warranted. It did not actually do so.

discretion, whereas PT is much less compatible with freedom to act.

Forward Guidance

Forward guidance involves announcing the future path of the central bank's policy rate over a fairly long horizon. When the Bank of Canada lowered its overnight rate to 0.25 percent in April 2009 (the rate considered by the Bank to be its effective lower bound), it also announced a path for the policy rate through the first half of 2010.[16]

> With monetary policy now operating at the effective lower bound for the overnight policy rate, it is appropriate to provide more explicit guidance than is usual regarding its future path so as to influence rates at longer maturities. Conditional on the outlook for inflation, the target overnight rate can be expected to remain at its current level until the end of the second quarter of 2010 in order to achieve the inflation target. The Bank will continue to provide such guidance in its scheduled interest rate announcements as long as the overnight rate is at the effective lower bound.

By announcing its intentions to keep the short-term interest rate at its lower bound for an extended period of time, thereby influencing expectations for the short-term nominal interest rate, the Bank also affected interest rates at longer horizons. Its commitment to keep interest rates low was conditional, and the main condition was "the outlook for inflation." However, the Bank did not specify a precise inflation rate or an expected inflation rate that would actually trigger a move away from the lower bound.[17]

For its part, the Fed has used forward guidance repeatedly since the 2008 financial crisis.[18] In December 2008, the Federal Open Market Committee (FOMC) announced that "economic conditions are likely to warrant exceptionally low levels of the federal funds rate for some time." The length of the time period was not specified. The FOMC used similar language in each of its periodic statements until August 2011 when the time period was made more explicit, and it noted that economic conditions "are likely to warrant exceptionally low levels for the federal funds rate at least through mid-2013." In January 2012, the period was extended until "late 2014." More recently, on September 13, 2012, it again extended the period "at least through mid-2015."

The Fed announcements all stated that it was "likely" that it would keep the federal funds rate at exceptionally low levels, without defining the circumstances that would trigger a move away from these low levels. This allowed the Fed to use its discretion to decide that current circumstances warranted an increase, irrespective of previous pronouncements. If forward guidance were instead explicitly made contingent on economic conditions, it would make the Fed more predictable and credible but would reduce its discretion.

QE

QE involves expanding the size of the central bank's balance sheet by engaging in large purchases of assets on the open market. Open market operations are a traditional part of a central bank's toolkit. Yet QE as practised by the Fed after 2008 was unconventional for three reasons.

16 See Bank of Canada (2009, 2009b).

17 Melino (2011) concludes that the Bank's conditional commitment helped the Canadian economy to exit the recession more quickly, but notes "the vagueness of the notion of what constituted a substantive change in the inflation outlook."

18 See Thornton (2012).

1. The increases in its balance sheet were unprecedented in size.[19]
2. The Fed expanded the types of assets purchased to include longer-term government debt and also private-sector assets, both fixed-income securities and equities.
3. QE came to be associated with "exit strategies," the idea that with economic recovery, increasing inflation and policy rates rising from their lower bound, the massive increase in the Fed's balance sheet would be unwound. The exact trigger and the final level and composition of the Fed's balance have never been specified in detail, once again giving much leeway for discretion.

The Fed aggressively expanded its balance sheet in the wake of the Lehman Brothers bankruptcy in September 2008. It has engaged in two subsequent QE rounds. Buying assets other than government securities and the extension of loans to non-bank institutions such as AIG, constituted an expansion of the Fed's discretionary powers.

QE was accompanied by other measures implemented by the Fed alone or in conjunction with the US Treasury. The discretionary nature of these measures is highlighted by both White (2010) and Cochrane (2012). White judged that the Fed's actions were not only discretionary but also questioned whether they were all legal under the *Federal Reserve Act*. Cochrane (2012) judged that the exercise of such discretion should bring into question the Fed's independence from elected and accountable officials.

Bank and other bailouts (Bear Stearns, AIG, the forced takeover of Merrill Lynch, etc.) also constituted an unexpected transfer of wealth from taxpayers to bank stakeholders (particularly senior bondholders). This increased expectations that certain banks were "too big to fail," raising important issues of moral hazard and potentially encouraging managers and shareholders to take risks knowing that taxpayers would bear the downside risks.[20]

The overall effectiveness of the Fed's QE policies remains a matter for debate.[21] They may have decreased yields on assets with longer maturities relative to those with shorter maturities. They may have reduced deflationary pressures by increasing the size of the monetary base, but evaluating the monetary base's impact on inflation and prices is made difficult by the unprecedented decrease in the velocity of circulation of base money during this period. This, in turn, may be related to the uncertainty of the post-tapering level of the Fed's balance sheet, but such a view is also controversial.[22]

The relative robustness of Canada's financial sector during the crisis, combined with the mildness of the Canadian recession, meant that the Bank of Canada needed not travel very far down the road of QE. After the first onset of the financial crisis in 2007, it announced a "term purchase and resale agreements" program to provide liquidity to the financial system by purchasing eligible securities to be resold at a fixed price from eligible financial institutions.

Yet the policy was limited in scope. In fact, the Bank of Canada's balance sheet increased by about 50 percent as a share of GDP from 2007 to 2009, before falling back to its previous level. This is in contrast to the Fed, whose balance sheet has more than doubled as a share of GDP since 2007.[23] It

19 See Chart 2 of Santor and Suchanek (2013).
20 Roberts (2010) contains a cogent discussion of the moral hazard problems that were exacerbated by the Fed's bailouts.
21 See Santor and Suchanek (2013) for a summary of some of the literature.
22 See Woodford (2011) for one point of view.
23 See Santor and Suchanek (2013).

is, of course, impossible to know what the Bank of Canada would have done in the face of a more highly distressed financial sector, but in 2008 it announced principles to guide its future liquidity interventions. They were intended to limit the scope and duration of intervention while minimizing its distortions and mitigating moral hazard.[24] This may indicate a greater willingness on the part of the Bank of Canada compared to the Fed to tie its own hands.

OBJECTIONS TO PT

Canada

With its intensive research effort to study the advantages of PT, the Bank of Canada showed more willingness ex ante to entertain the possibility of PT than any other central bank. Despite the severity of the Great Recession in many countries, particularly the United States, Canada's was the mildest in the past 30 years.[25] Canada's financial system and banks also weathered the recession much better than their American counterparts. The Bank of Canada itself made the case that Canada's monetary policy framework performed quite well during the crisis and that moving to a completely different monetary framework was not warranted, especially given the uncertainty involved in such a transition.

The Bank of Canada's own case against adopting PT is laid out most clearly in its background paper to the renewal of its Inflation-Control Target Agreement with the federal government (Bank of Canada, 2011). The document claims that PT's benefits in terms of economic welfare would be modest, although it acknowledges that these benefits would be enhanced once the costs and risks of the nominal interest rate hitting its zero lower bound are incorporated (p. 14). The key phrase in the Bank's document is probably the following (p. 14): "However, these models assume that agents are forward-looking, fully conversant with the implications of PLT (price-level targeting) and trust policymakers to live up to their commitments." On the basis of its own studies and those of outside academics, the Bank doubted PT would have sufficient credibility, especially immediately upon its implementation, and whether individuals would understand the workings of such a monetary policy framework and form their inflationary expectations accordingly.

The Bank reached this conclusion despite some of the evidence produced by its own research program. Using experimental evidence, Amano, Engle-Warnick and Shukayev (2011) showed that individuals would, in fact, be quick to adapt to a regime switch from IT to PT and to base their inflation forecasts on the knowledge that the price level reverts to its target path.

There is other evidence to suggest that having to learn about PT when it is first implemented does not overturn its advantages. Gaspar, Smets and Vestin (2007) used an adaptive learning model to simulate the transition to PT. They concluded that PT retains its advantage over IT even if agents must gradually learn how the new regime works. They used the European Central Bank's forecasting model, very similar in structure to the Bank of Canada's ToTEM model, so their conclusions would also apply in the Canadian case (subject to the validity of the modelling framework).

24 See Longworth (2010) for details.

25 See Bank of Canada (2011).

Meanwhile, the Bank of Canada's study by Kryvtsov, Shukayev and Ueberfeldt (2008) was somewhat more pessimistic. They concluded that a temporary loss in credibility following the announcement of a transition to PT could lead to short-run costs that would not be made up by later gains.

The Bank of Canada's own bottom line concerning PT, as expressed in its 2011 report, was a message of prudence:

> Given the current state of knowledge, the potential benefits of PLT (Price level targeting) in increasing long- term certainty about the price level and providing greater short-term macroeconomic stability, relative to the current IT framework, do not clearly outweigh the costs and risks associated with real-world expectations and credibility falling short of the model ideal.

The Bank of Canada viewed the mildness of the 2008-2009 recession as confirmation that its IT regime was delivering good results and a rationale for not fixing an unbroken policy framework. Ragan (2011) echoes these arguments, noting that PT could be "confusing" because of the need for inflation expectations to be variable, in contrast to the simplicity of IT where inflation at all but the shortest horizons will be anchored to the inflation target.

Some authors have argued that the benefits of Canada moving to PT would be small because the historical performance of the price level has been close to that under a PT regime. Figure 2 in Melino (2011) shows that Canada's CPI has drifted very little from constant 2 percent inflation between January 1996 and November 2010, whether this is due to good monetary policy or historical accident (the particular sequence of positive and negative shocks to inflation in Canada over the period).

The choice of a start date may also be important in comparing the impact of an IT-to-PT shift. Boivin (2009, Figure 2) shows that projecting the price level path forward from 1992 leads to a substantial and persistent divergence of Canada's actual CPI from this path.

Although this is not explicit in its background document (Bank of Canada, 2011), the Bank of Canada has clearly been concerned about preserving its discretionary powers. Governor Mark Carney (2009) made this quite clear:

> The design of monetary policy frameworks depends in part on the trade-off between flexibility and credibility. This, in turn, is a function of both the extent to which (inflexible) rules enhance credibility and the ability of central banks to exercise the discretion required to deploy any flexibility in a credible manner.

The Bank of Canada believes that discretion is a useful feature of its monetary policy framework. Although it does not explicitly acknowledge this, PT's greater necessity for commitment inevitably removes much of this discretion. As noted above, Vestin (2006) shows that targeting the price level instead of inflation can substitute for commitment: it obliges the central bank to take account of past rates of inflation rather than allowing it to ignore past deviations from its target, just as if it had explicitly committed to its policy upon observing past inflation.

The theme of flexibility was also at the heart of a 2012 Carney speech:

> We did so because, in a complex and continuously evolving world that no one can predict with certainty, policymakers need a robust framework; one that remains appropriate no matter the circumstances. Inflation targeting is disciplined but flexible. It allows central banks to deliver what is expected while dealing with the unexpected.

This quote highlights what McCallum (2004) views as a crucial distinction between the way central bankers view discretion and the way it is viewed by academics:

> From the academic point of view, by contrast, the main issue is not about flexibility or its absence.

> Instead, the central issue is whether monetary policy is conducted in a period-by-period fashion – that is, as a sequence of unrelated decisions – or instead in a "rule-based" manner that views policy as an ongoing process. To explore the nature of this distinction, let us suppose that in either case policy is conducted so as to be optimal or "best" in relation to current economic conditions. The first way of proceeding is for the central bank to respond optimally to today's conditions, treating past conditions (and expectations formed in the past) as unalterable and therefore irrelevant. Also, the central bank recognizes that tomorrow it will do the same; it will optimize anew, treating today's conditions and expectations as irrelevant for decisions taken tomorrow. This is the standard way, developed by engineers and applied mathematicians, of conducting "optimal control analysis." It represents, to academic monetary economists, policymaking under a regime of "discretion."

Discretionary policymaking takes as irrelevant today's expectations when making tomorrow's decisions. Central bankers that value discretion will not attempt to influence those expectations by announcing that inflation could and should be different from its long-run target rate in the medium run in order to unwind the effects of previous shocks on the price level. PT is a policy based upon influencing today's expectations of future inflation. Since the Bank of Canada has never followed what could be termed a rule-based policy (from an academic point of view), it is not surprising that it would be reluctant to undertake a radical change in its monetary policy framework.

The Bank of Canada has shown concern about inflation expectations, but its concern is limited to making sure that inflation expectations in the medium term are well-anchored and equal to its target, irrespective of current economic conditions. The Bank's *Monetary Policy Reports* contain guidance on the Bank's time horizon for inflation to return to its target. However, it is impossible to verify ex post whether the time horizon is realistic and credible since the return to the target is contingent on an absence of further economic shocks, a condition that is never realized. Committing to an unverifiable time horizon means not committing to anything concrete.

Because of Canada's positive historical performance under an IT regime, the Bank of Canada has acquired credibility over time. Inflation expectations in Canada are strongly anchored at 2 percent for all but the shortest horizons, which indicates that markets think that the Bank of Canada is able to hit its inflation target with only temporary deviations.

Meanwhile, the game theory literature shows that reputation can act as a commitment device. In other words, the Bank's solid reputation may be enough to put a brake on its exercise of discretion. This may be a topic worthy of further study.

The US Case

In contrast to Canada, the US post-2008 suffered its severest recession since the Great Depression. It was also of a relatively new type. Gorton (2010) characterized the interbank market panic as a 21st century bank run, with banks and other financial institutions suddenly refusing to renew short-term financing to one another, as opposed to previous bank runs caused by depositors simultaneously attempting to withdraw funds from chartered banks. Given the severity of the latest US crisis, it is not surprising that a large number of policymakers and academics suggested PT as a possible response, as noted in Section 3. Most of the proposals for moving toward PT promoted it not as a new and permanent monetary policy framework but rather as a policy contingent on the Fed's target for the federal funds rate being stuck at the zero lower bound.

The possibility of reneging was actually built into some of the proposals to announce a target for the price level. Evans (2010) proposed a "contingent" price-level path to be implemented at the zero lower bound, but which would disappear once a

more normal policy rate was reestablished. He wrote:

> I consider price-level targeting a policy option that is only appropriate for the unusual situation of a liquidity trap. In more usual times, the Fed would address lower- than-desirable levels of employment and inflation by adjusting the federal funds rate. However, as discussed earlier, we are currently constrained from doing so by the zero bound.

This suggests that once the federal funds rate was no longer at its zero bound, the targeted price-level path could be abandoned before the price level regained its pre-announced path. Evans's proposal seems to ignore the fact that all of the benefits from PT come from its impact on inflation expectations, that this impact hinges critically on credibility, and building the possibility of abandoning the targeted path into the initial announcement is a sure recipe for robbing the proposal of its beneficial effects. This argument is applicable more generally. Any implementation of PT understood to be a possibly temporary policy to address particular economic circumstances would fail due a lack of credibility.

Evans's proposal also involved establishing a price-level target path that retroactively corrected for price-level drift. Since any price-level path involves picking an initial level, he proposed a target path that extended from December 2007. If his proposal had been adopted, it would have undermined expectations that, under IT, the central bank would let bygones are bygones. Implementing a monetary policy framework whose success hinges on commitment by breaking a previous implicit promise is not a good way to establish credibility.

In the US context, any policy that entails a period of inflation higher than the Fed's announced target of 2 percent[26] would also encounter problems from the "inflation hawks" on the Fed's Open Market Committee. (The Fed publishes the FOMC deliberations, whereas the Bank of Canada's Governing Council meets behind closed doors and dissenting views are masked by the consensus view that accompanies the Bank's announcement of its overnight rate.)

Proposals to switch to PT when the economy is at the zero lower bound promise higher inflation than the target in the short to medium run, without also committing to undoing positive shocks to inflation in the future. In this respect, inflation hawks may have a valid point. Their point of view is well summarized by Kocherlakota (2011):

> Moreover, I believe that the FOMC could only have systematically lowered the unemployment rate further by generating inflation rates over a multiyear period that were higher than its communicated objective of 2 percent. Such an outcome could potentially lead the public to lose faith in the credibility of the FOMC's communicated objective and thereby increase the probability that the FOMC would lose control of inflation. As I discussed earlier, this scenario would require a policy response that would generate substantial losses of employment.

Hetzel (2012) contends that discretion helps achieve consensus within a monetary policy committee such as the FOMC:

> Another political economy advantage of the language of discretion is how the focus on individual policy actions facilitates the ability of the FOMC chairman to achieve consensus within the FOMC. The chairman would achieve consensus only with difficulty over an articulation of policy as a systematic set of procedures for responding to the economy in a way designed to trade off between conflicting objectives. The language of discretion allows the chairman to avoid divisive issues about what variables the central bank controls and how it exercises that control.

26 As noted in the introduction, this target was first announced explicitly in January 2012. See Federal Reserve Board (2012).

Remarks made by Ben Bernanke (2003b) when he was a governor of the Federal Reserve Bank of New York, soon after leaving academia, defined his concept of "constrained discretion":

> First, through its words and (especially) its actions, *the central bank must establish a strong commitment to keeping inflation low and stable*. Second, subject to the condition that inflation be kept low and stable, and to the extent possible given our uncertainties about the structure of the economy and the effects of policy, *monetary policy should strive to limit cyclical swings in resource utilization* (emphasis in the original).

This passage seems to be more about describing the objective function of the central bank. He equates "unfettered" discretion with the absence of an objective function. He also equates commitment with following a rule independent of economic conditions such as Friedman's (1960) "k-percent rule" that specifies a constant of base money growth. This sets up a strawman version of commitment that is more in line with the way central bankers, as opposed to academics, view commitment, following McCallum's (2004) distinction outlined in the previous sub-section. For Bernanke, having an objective function is the only constraint on policy that is desirable, and the central bank should be able to respond to current economic conditions, unconstrained by past promises or by the necessity to offset the effects of past shocks.[27]

Conclusions

PT has convincing advantages, especially as a tool for avoiding the worst consequences of economic downturns. Switching to a new monetary policy framework would necessitate a public learning curve, but this would be likely to diminish rather than overturn PT's advantages. Nevertheless, central banks (especially the Bank of Canada) have been intrigued by PT's potential, but had practical reasons for not adopting it during the last recession. Suddenly promising to boost inflation above target in a recession without having demonstrated a willingness to do the opposite in booms with higher inflation would rob such promises of much of their needed credibility.

However, the main reason that central banks have not experimented with PT is that they are too wedded to the ability to exercise discretion in the conduct of monetary policy. PT acts as a substitute for commitment in the sense of Kydland and Prescott (1977). IT is a regime that allows bygones to be forgotten and allows the central bank to decide on its optimal policy without regard to past economic conditions. Central bankers have resisted strongly academic studies demonstrating the superiority of rules-based approaches to monetary policy as imposing too much rigidity on the monetary policy process and robbing them of the flexibility to react to circumstances not accounted for in their forecasting models or in mechanical rules.[28] The financial crisis was a special circumstance par excellence.

PT has disappeared recently from academic discussions and from central bank working paper series, and it has all but disappeared from discussions on the blogosphere. The main alternative monetary policy framework discussed actively today is nominal GDP targeting (NGDPT), which replaces a target price level path with a target path for nominal income.[29] Nominal income becomes the long-run anchor for monetary policy rather than the price level.

27 Carney (2013) also seems to conflate discretion with the absence of a clearly defined objective function.

28 There are no doubt political economy considerations involved as well. Discretion means more power and less accountability.

29 See Christensen (2011), Sumner (2011) and Beckworth (2010) for summaries of the ideas behind NGDPT.

Under NGDPT, deviations of nominal income from the target path are the only measure of the need for tightening or loosening, so it is potentially simpler.[30] In contrast, under PT the need for tightening or loosening of monetary policy is measured not only by deviations of the price level from target but also on measures of the output gap, which is not directly observable. NGDPT with a level target is a framework in which bygones are not bygones and deviations from target must be corrected. In this respect, it is a rules-based approach to monetary policy similar to PT. Time will tell if NGDPT gains enough traction to overcome central bankers' reluctance to accepting limits on their discretion. The active discussion concerning NGDPT will keep alive the debate over rules versus discretion.

30 NGDPT has the added advantage of ensuring an appropriate response to a supply shock that moves real output and the price level in opposite directions. A PT rule would lead central banks to expansionary monetary policy in booms and contractionary policy in downturns, while NGDPT would not force the central bank to magnify changes in real output to offset the changes in prices.

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